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(54) FOLD REAR-VIEW MIRROR ASSEMBLY FOR MOTOR VEHICLES

KLAPPBARE RÜCKSPIEGELANORDNUNG FÜR KRAFTFAHRZEUGE

ENSEMBLE RÉTROVISEUR PLIABLE POUR DES VÉHICULES À MOTEUR

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EP 3 408 139 B1

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Description

[0001] The present disclosure relates to fold rear-view mirror assemblies for motor vehicles and methods for assembling and disassembling them.

BACKGROUND ART

[0002] Known rear-view mirror assemblies comprise a base member for being mounted on a suitable outer portion of motor vehicles, and a mirror housing adapted for receiving a mirror pane therein. The mirror housing is arranged so that it can be rotated relative to the base member around a mirror rotation axis between at least a mirror operative condition, or drive position, and a mirror folded condition, or parking position, and vice versa.

[0003] A shaft is provided for rotation of the mirror housing relative to the base member. A compression spring is also provided surrounding the shaft so that it is compressed against a stop. Rotation of the mirror housing relative to the base member around the shaft causes the mirror housing to be displaced vertically relative to the base member compressing said spring until a determined mirror condition, such as said mirror folded position, has been reached. Then, the mirror housing is displaced downwards again relative to the base member releasing said spring.

[0004] The above mentioned stop against which the spring is compressed upon rotation of the mirror housing relative to the base member may be for example a push nut as disclosed in US2011255188. This push nut has elastic portions for clipping to the shaft. Due to elasticity of the elastic portions and the force of the spring an opening preventing portion is required to be formed on the shaft to avoid the elastic portions from being deformed from the inside to the outside in the radial direction of the shaft.

[0005] In order to avoid the need for an opening preventing portion to be securely mounted on the shaft, US2009086351 provides a stopper made of resin that is fixed to the shaft for compressing the spring. The stopper is a ring-shaped main body made of an elastic resin with a plurality of engaging nails arranged along an inner peripheral surface of the main body and elastically engaged with an engaging portion. As the shaft is inserted, the main body is elastically deformed and each of the engaging nails is brought into contact with the contacting portion. The main body elastically returns to an original shape when each of the engaging nails reaches the engaging portion.

[0006] In the rear-view mirror assembly disclosed in US2004233557, a spring clip fixedly positioned around the shaft is used as a stop of the spring. The spring clip has an inner retaining tab portion for engaging the shaft as it is press fitted thereon. In this rear-view mirror assembly, a bracing member is required between the spring and the spring clip to avoid direct contact therebetween.

[0007] The spring clip is engaged with the bracing

member so that it is locked in an upward longitudinal movement to the shaft

JP2003028222 discloses a fold rear-view mirror assembly for vehicles according to the preamble of claim 1.

[0008] None of the above prior art rear-view mirror documents provide a rear-view mirror assembly whose spring can be easily assembled and disassembled while its compression function is still performed efficiently. There is thus a need for a rear-view mirror assembly having a stop member for the spring that can be easily fitted into and removed from the shaft while performing a spring compression function efficiently.

SUMMARY

[0009] The present fold rear-view mirror assembly comprises a base member for being mounted on a motor vehicle and a mirror housing for receiving a mirror pane therein. The mirror housing is arranged so that it can be rotated relative to the base member around a mirror rotation axis between at least a mirror operative condition, or drive position, and a mirror folded condition, or parking position, and vice versa.

[0010] A shaft is provided such that the mirror housing is allowed to be rotated relative to the base member between said operative and folded conditions and vice versa. Associated with the shaft is an elastic element, such as for example a compression spring, arranged such that a force is applied on both the base member and the mirror housing.

[0011] The present fold rear-view mirror assembly further includes a retaining mechanism. The retaining mechanism comprises a locking member adapted for carrying a flexible retaining element clamped therein. The locking member may have at least one stop portion adapted for limiting movement of the flexible retaining element between the release and lock positions.

[0012] As used herein, the feature that a flexible retaining element is clamped in the locking member means that the retaining element is in general fastened, tightened, gripped, pressed or otherwise held therewith such that the flexible retaining element can be moved relative to the locking member between at least two different positions:

- a release position, in which the flexible retaining element can be moved relative to the shaft, and
- a lock position, in which the flexible retaining element is received in a recess formed in the shaft causing the flexible retaining element to be locked to the shaft so that the elastic element is axially retained against the locking member.

[0013] The flexible retaining element, which may be embodied for example in the form of a flat spring, acts as a stop for the elastic element mounted around the shaft and can be removed easily from the shaft.

[0014] The locking member is capable of retaining the

flexible retaining element locked to the shaft in the locked position. In this case, the locking member may comprise at least one portion such as a wall or protrusion adapted to limit deformation in the locked position, such as a deformation in a direction that is radial to the shaft of the flexible retaining element, so as to retain the retaining element locked to the shaft.

[0015] The shaft may include at least one sloped surface. As the retaining element slides on the sloped surface as it is mounted on the shaft, it is expanded prior to be received in the shaft recess.

[0016] The flexible retaining element may be shaped to at least partly mate a section of the shaft along the shaft recess and sized such that, when received in the shaft recess, the flexible retaining element is in one of a relaxed or a stretched state. In other words, the flexible retaining element may be sized such that it substantially corresponds to a shaft section along the shaft recess such that the flexible retaining element is relaxed in the lock position or, alternatively, the flexible retaining element may be sized such that it is smaller than said shaft section along the shaft recess such that the flexible retaining element is expanded in the lock position.

[0017] The flexible retaining element has at least one hooking portion formed at one end thereof. The hooking portion comprising an at least substantially curved free end portion adapted for preventing the flexible retaining element from being removed from the locking member. This helps with the pre-assembly of the flexible retaining element.

[0018] Combined with the above described features of the present fold rear-view mirror assembly, at least one of the following additional features may be also included.

[0019] For example, the present fold rear-view mirror assembly may further include a motor configured to provide rotation of the mirror housing around the mirror base. Associated with the motor, drive means may be also provided comprising a gear wheel engaging the motor with the base member for driving the mirror housing in rotation relative to the base member around the mirror rotation axis between at least the drive position and the parking position, and vice versa. The gear wheel may be disposed, for example, coaxially with the mirror rotation axis.

[0020] The present fold rear-view mirror assembly may also include an illumination module. An imaging device may be provided for imaging an image of the surroundings of the vehicle.

[0021] A mirror pane is usually provided housed in the mirror housing and positioned so as to provide a substantially rear field of view to a vehicle driver when the mirror housing is positioned in the driving position. In some examples, the mirror housing may be adapted for receiving the imaging device configured for imaging an image of the surroundings of the vehicle, such as a video camera. The mirror pane may also include a heating element. In other examples, an actuation mechanism may be provided to provide orientation of the mirror pane to adjust the rear field of view of the vehicle driver.

[0022] A number of different configurations for said mirror pane are possible. It may be for example an anti-glare mirror pane, such as a mirror pane using a cell of electrically changeable optical characteristic or a mirror pane using a liquid filtering layer of variable thickness. Examples of cells of electrically changeable optical characteristic are liquid-crystal and electrochromic mirrors. In further examples, the mirror pane may further comprise a heating element. An anti-glare mirror pane might be housed in the mirror housing and positioned so as to provide a substantially rear field of view to a vehicle driver when the mirror housing is positioned in the driving position. Also, a spotter mirror might be housed in the mirror housing and positioned so as to substantially provide vision of a vehicle blind spot region to the vehicle driver when the mirror housing is positioned in the driving position.

[0023] The present fold rear-view mirror assembly may also include an antenna for communicating with a radio-frequency reception system, an outdoor temperature sensing device to sense an outdoor temperature of the vehicle, etc.

[0024] On the other hand, the base member may be provided with recesses formed therein for cooperating with corresponding projections formed in the mirror housing. Recesses and projections are part of a detent mechanism for locking the mirror housing in specific stable angular positions to the base member.

[0025] Rotation of the mirror housing relative to the base member causes the projections of the mirror housing to slide relative to the recesses of the base member causing the mirror housing to be displaced vertically relative to the base member compressing a main spring until a mirror condition, such as a mirror folded or parking position, has been reached. Then, the mirror housing is displaced downwards again relative to the base member releasing the main spring. The process for turning the mirror housing back to the mirror operative condition, or driving position, is the same as disclosed but in the reverse order. The mirror housing recesses may be provided instead in the gear wheel in motorized examples.

[0026] For assembling the above described fold rear-view mirror assembly a retaining mechanism with a locking member having a flexible retaining element clamped therein is first provided. Then, the locking member is inserted into the shaft of the rear-view mirror assembly against the elastic element arranged therebetween. This causes the flexible retaining element to be received in a shaft recess so as to axially retain the elastic element against the locking member. This might also cause the elastic element to expand as it slides onto a shaft sloped surface until it is received in the shaft recess.

[0027] For disassembling the present mirror assembly, a force is applied on the retaining mechanism against the elastic element. The retaining mechanism is rotated so as to cause it to expand to come out of the shaft reduced diameter portion and out of the shaft recess. The force applied is then released to the retaining mechanism.

nism.

[0028] The present fold rear-view mirror assembly has the advantage that the flexible retaining element can be removed easily and quickly from the shaft. Advantageously, one push load is simply required for retaining the locking member. The locking member locks itself by the force of the elastic element. In addition, the retaining mechanism with the locking member and the flexible retaining element clamped therein can be preassembled in a production line different from that of the rear-view mirror assembly. For disassembling, only a press downward force and a rotation of the locking member are required.

[0029] Additional objects, advantages and features of the present disclosure will be clear to those skilled in the art upon examination of the description, or may be learned by practice thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] A particular example of the present fold rear-view mirror assembly will be described in the following by way of non-limiting examples, with reference to the appended drawings, in which:

Figure 1 is an exploded perspective view of one example of the present fold rear-view mirror assembly; Figure 2 is a fragmentary perspective view showing the retaining mechanism mounted in the mirror assembly; Figure 3 is cross-sectional view of the retaining mechanism shown in figure 2; Figure 4 is a top plan view of the retaining mechanism shown in figures 2 and 3; Figure 5 is a front elevational view of the shaft; Figure 6 is a cross sectional view taken along line A-A' of the shaft shown in figure 5; and Figure 7 is a longitudinal sectional view of the shaft shown in figure 5.

DETAILED DESCRIPTION OF EXAMPLES

[0031] In the example shown in figures, the rear-view mirror assembly 100 comprises a mirror housing 110 and a base member 120. The base member 120 is intended to be mounted on a suitable outer portion of a motor vehicle, not shown in the drawings. The mirror housing 110 can be rotated relative to the base member 120 around a mirror rotation axis X between a mirror operative condition (drive position) and a mirror folded condition (parking position), and vice versa. A sliding track 170 is provided for facilitating rotation of the mirror housing 110 to the base member 120.

[0032] The mirror housing 110 is adapted for receiving a mirror pane therein (not shown). The mirror housing 110 further includes a motor housing 115 for receiving therein a motor (not shown) to provide rotation of the mirror housing 110 around the mirror base 120. The mo-

tor housing 115 is also adapted for receiving therein drive means (not shown) associated with the motor comprising a gear wheel engaging the motor with the base member 120 for driving the mirror housing 110 in rotation.

[0033] In order to allow the mirror housing 110 to be rotated around the mirror rotation axis X between said mirror operative and folded positions, a shaft 140 and an elastic element 160 associated therewith are provided. In the example shown in the drawings, the elastic element 160 is a compression spring that is arranged around the shaft 140 such that a compression force is applied both on the base member 120 and the mirror housing 110.

[0034] The compression spring 160 applies said compression force due to the provision of a retaining mechanism 200. The retaining mechanism 200 comprises a locking member 260 that is adapted for carrying a flexible retaining element 250 clamped therein. In the example shown in the figures, the retaining element 250 is in the form of a lock spring.

[0035] As shown in figures 1 and 4 and figure 6, the locking member 260 has stop portions 262. The stop portions 262 are adapted for limiting movement of the lock spring 250 between the release position and the lock position.

[0036] In use, and once duly inserted in the locking member 260, the lock spring 250 is clamped into the locking member 260, as shown in figures 3 and 6, such that it can be moved relative thereto. Specifically, the lock spring 250, that is clamped into the locking member 260, can be moved (vertically along axis X in the drawings) between a first release position, in which the lock spring 250 can be moved relative to the shaft 140, and a second, lock position, in which the lock spring 250 is received in a recess 142 that is formed in the shaft 140 as shown in figure 3. In this lock position of the lock spring 250, the lock spring 250 is locked to the shaft 140 so that the spring 160 is axially retained and compressed against the locking member 260. The spring 160 is thus retained by lock spring 250 in position through one push locking action as it will be explained further below.

[0037] The locking member 260 comprises at least one portion adapted to limit deformation of the lock spring 250 in a direction radial to the shaft 140 in the locked position so as to retain it locked to the shaft 140. In the example shown in the figures, said portion is a wall 265.

[0038] As shown in figures 2 and 4, the shaft 140 includes two opposite sloped surfaces 145. The sloped surfaces 145 are adapted so that the lock spring 250 slides thereon. Thus, as the locking member 260 is inserted in the shaft 140, the lock spring 250 is expanded prior to be received in the recess 142 of the shaft 140.

[0039] For assembling the above described fold rear-view mirror assembly 100 a retaining mechanism 200, which is preassembled with a locking member 260 with a lock spring 250 clamped therein, is first provided. A preassembled locking assembly 250, 260 is thus provided to be mounted on the shaft 140. Said locking assembly 250, 260 is formed by pushing the lock spring 250 radially

into the locking member 260 through an opening 270 that is formed in the locking member 260 as shown in figure 2. A recess 275 is formed in said opening 270 to facilitate radial insertion of the locking member 260. As the lock spring 250 is pushed radially into the locking member 260, the lock spring 250 is retained therein with no tension and prevented from sliding out.

[0040] The preassembled locking assembly 250, 260 is then inserted into the shaft 140 against the spring 160 that is arranged therebetween. Insertion of the locking member assembly 250, 260 into the shaft 140 causes the lock spring 250 to expand as it slides upon the above mentioned sloped surfaces 145 of the shaft 140 until it is received in the above mentioned corresponding recesses 142 of the shaft 140. This causes the spring 160 to be axially retained against the locking member 260.

[0041] For disassembling the locking assembly 250, 260, starting from a locking condition of the lock spring 250 to the locking member 260, a force should be applied on the locking member 260 against the spring 160 while rotating the locking member 260 relative to the shaft 140. This causes the lock spring 250 to expand such that it comes out of the recess 142 of the shaft 140. Then, the force on the locking member 260 can be released.

Claims

1. A fold rear-view mirror assembly (100) for motor vehicles, the assembly (100) comprising:

- a base member (120) for being mounted on a motor vehicle;
- a mirror housing (110);
- a shaft (140) arranged such that the mirror housing (110) is allowed to be rotated relative to the base member (120) between a mirror operative condition and a mirror folded condition, and vice versa;
- an elastic element (160) associated with the shaft (140) and arranged such that a force is applied on both the base member (120) and the mirror housing (110); and
- a retaining mechanism (200) comprising a locking member (260) for carrying a flexible retaining element (250) clamped therein,

wherein the flexible retaining element (250) can be moved to the locking member (260) between at least a release position, in which the flexible retaining element (250) can be moved relative to the shaft (140), and a lock position, in which the flexible retaining element (250) is received in a recess (142) formed in the shaft (140) causing the flexible retaining element (250) to be locked to the shaft (140) so that the elastic element (160) is axially retained against the locking member (260),

characterized in that the flexible retaining element

(250) has at least one hooking portion comprising an at least substantially curved free end portion for preventing the flexible retaining element (250) from being removed from the locking member (260).

2. The fold rear-view mirror assembly (100) according to claim 1, where the locking member (260) is adapted to retain the flexible retaining element (250) locked to the shaft (140) in the locked position.
3. The fold rear-view mirror assembly (100) according to claim 2, where the locking member (260) comprises at least one wall or protrusion (265) adapted to limit deformation of the flexible retaining element (250) in the locked position so as to retain it locked to the shaft (140).
4. The fold rear-view mirror assembly (100) according to claim 3, where said wall or protrusion (265) is adapted to limit deformation of the flexible retaining element (250) in a direction radial to the shaft (140).
5. The fold rear-view mirror assembly (100) according to any of the preceding claims, where the shaft (140) includes at least one sloped surface (145) upon which the retaining element (250) can slide causing it to expand prior to be received in the shaft recess (142).
6. The fold rear-view mirror assembly (100) according to any of the preceding claims, where the flexible retaining element (250) is shaped to at least partly mate a section of the shaft (140) along the shaft recess (142).
7. The fold rear-view mirror assembly (100) according to claim 6, where the flexible retaining element (250) is sized such that, when received in the shaft recess (142), the flexible retaining element (250) is expanded.
8. The fold rear-view mirror assembly (100) according to claim 6, where the flexible retaining element (250) is sized such that, when received in the shaft recess (142), the flexible retaining element (250) is in a relaxed state.
9. The fold rear-view mirror assembly (100) according to any of the preceding claims, where the locking member comprises a locking washer (260) inside of which the shaft (140) can be inserted.
10. The fold rear-view mirror assembly (100) according to any of the preceding claims, where the flexible retaining element comprises a lock spring (250) that can be clamped inside the locking member (260) and moved therein between said release and lock positions.

11. The fold rear-view mirror assembly (100) according to any of the preceding claims, where the locking member (260) has at least one stop portion (262) for limiting movement of the flexible retaining element (250) between said release and lock positions.

12. A method for assembling a fold rear-view mirror assembly (100) for motor vehicles as claimed in any of the preceding claims, the method comprising:

- providing a retaining mechanism (200) with a locking member (260) having a flexible retaining element (250) clamped therein, and
- inserting the shaft (140) of the mirror assembly (100) inside the locking member (260) against the elastic element (160) arranged therebetween, causing the flexible retaining element (250) to be received in a shaft recess (142) so as to axially retain the elastic element (160) against the locking member (260) and causing the elastic element (160) to expand as it slides upon a shaft sloped surface (145) until it is received in the shaft recess (142).

13. A method for disassembling a fold rear-view mirror assembly (100) for motor vehicles as claimed in any of the claims 1-11, the method comprising:

- applying a force to the retaining mechanism (200) against the elastic element (160),
- rotating the retaining mechanism (200) so as to cause the retaining element (250) to expand to come out of the shaft recess (142), and
- release the force to the retaining mechanism (200).

Patentansprüche

1. Klappbare Rückspiegelanordnung (100) für Kraftfahrzeuge, wobei die Anordnung (100) umfasst:

- einem Basiselement (120) zur Montage an einem Kraftfahrzeug;
- ein Spiegelgehäuse (110);
- eine Welle (140), die so angeordnet ist, dass das Spiegelgehäuse (110) relativ zu dem Basiselement (120) zwischen einem Spiegel-Betriebszustand und einem Spiegel-Klappzustand und umgekehrt gedreht werden kann;
- ein elastisches Element (160), das der Welle (140) zugeordnet ist und so angeordnet ist, dass seine Kraft sowohl auf das Basiselement (120) als auch auf das Spiegelgehäuse (110) ausgeübt wird; und
- einen Haltemechanismus (200), der ein Verriegelungselement (260) zum Tragen eines darin eingeklemmten flexiblen-

Halteelements (250) umfasst,

wobei das flexible Halteelement (250) zwischen mindestens einer Freigabeposition, in der das flexible Halteelement (250) relativ zu der Welle (140) bewegt werden kann, und einer Verriegelungsposition zu dem Verriegelungselement (260) bewegt werden kann, wobei in der Verriegelungsposition das flexible Halteelement (250) in einer in der Welle (140) ausgebildeten Aussparung (142) aufgenommen ist, was bewirkt, dass das flexible Halteelement (250) mit der Welle (140) verriegelt wird, so dass das elastische Element (160) axial gegen das Verriegelungselement (260) gehalten wird, dadurch gekennzeichnet, dass das flexible Halteelement (250) mindestens einen Einhakenabschnitt aufweist, der ein wenigstens ein Wesentliches gekrümmtes freies Endabschnitt umfasst, um zu verhindern, dass das flexible Halteelement (250) von dem Verriegelungselement (260) entfernt wird.

2. Klappbare Rückspiegelanordnung (100) nach Anspruch 1, wobei das Verriegelungselement (260) geeignet ist, das flexible Halteelement (250) in der Verriegelungsposition an der Welle (140) verriegelt zu halten.

3. Klappbare Rückspiegelanordnung (100) nach Anspruch 2, wobei das Verriegelungselement (260) mindestens eine Wand oder einen Vorsprung (265) umfasst, die bzw. der geeignet ist, die Verformung des flexiblen Halteelements (250) in der Verriegelungsposition zu begrenzen, um es an der Welle (140) verriegelt zu halten.

4. Klappbare Rückspiegelanordnung (100) nach Anspruch 3, wobei die Wand oder der Vorsprung (265) geeignet ist, die Verformung des flexiblen Halteelements (250) in einer Richtung radial zur Welle (140) zu begrenzen.

5. Klappbare Rückspiegelanordnung (100) nach einem der vorhergehenden Ansprüche, wobei die Welle (140) mindestens eine schräge Fläche (145) aufweist, auf der das Halteelement (250) gleiten kann, wodurch es sich ausdehnt, bevor es in der Welleausnehmung (142) aufgenommen wird.

6. Klappbare Rückspiegelanordnung (100) nach einem der vorhergehenden Ansprüche, wobei das flexible Halteelement (250) so geformt ist, dass es zumindest teilweise an einem Abschnitt der Welle (140) entlang der Wellenausnehmung (142) anpasst.

7. Klappbare Rückspiegelanordnung (100) nach Anspruch 6, wobei das flexible Halteelement (250) so dimensioniert ist, dass das flexible Halteelement

(250) bei Aufnahme in der Wellenausnehmung (142) aufgeweitet ist.

8. Klappbare Rückspiegelanordnung (100) nach Anspruch 6, wobei das flexible Halteelement (250) so dimensioniert ist, dass sich das flexible Halteelement (250) bei Aufnahme in der Wellenausnehmung (142) in einem entspannten Zustand befindet. 5

9. Klappbare Rückspiegelanordnung (100) nach einem der vorhergehenden Ansprüche, wobei das Verriegelungselement eine Sicherungsscheibe (260) umfasst, in die die Welle (140) eingesetzt werden kann. 10

10. Klappbare Rückspiegelanordnung (100) nach einem der vorhergehenden Ansprüche, wobei das flexible Halteelement eine Verriegelungsfeder (250) umfasst, die im Inneren des Verriegelungselements (260) eingeklemmt und darin zwischen der Freigabe- und der Verriegelungsposition bewegt werden kann. 15

11. Klappbare Rückspiegelanordnung (100) nach einem der vorhergehenden Ansprüche, wobei das Verriegelungselement (260) mindestens einen Anschlagabschnitt (262) zum Begrenzen der Bewegung des flexiblen Halteelements (250) zwischen der Freigabe- und Verriegelungsposition. 20

12. Verfahren zum Zusammenbau einer klappbaren Rückspiegelanordnung (100) für Kraftfahrzeuge nach einem der vorhergehenden Ansprüche, wobei das Verfahren umfasst: 25
 - Bereitstellen eines Haltemechanismus (200) mit einem Verriegelungselement (260), in das ein flexibles Halteelement (250) eingeklemmt ist, und 30
 - Einführen der Welle (140) der Rückspiegelanordnung (100) innerhalb des Verriegelungselements (260) gegen das dazwischen angeordnete elastische Element (160), wodurch das flexible Halteelement (250) in einer Wellenausnehmung (142) aufgenommen wird, um das elastische Element (160) axial gegen das Verriegelungselement (260) zu halten und zu bewirken, dass sich das elastische Element (160) ausdehnt, wenn es auf einer geneigten Oberfläche (145) der Welle gleitet, bis es in der Wellenausnehmung (142) aufgenommen wird. 35

13. Verfahren zum Demontieren einer klappbaren Rückspiegelanordnung (100) für Kraftfahrzeuge nach einem der vorhergehenden Ansprüche 1-11, wobei das Verfahren umfasst: 40
 - Aufbringen einer Kraft auf den Haltemechanismus (200) gegen das elastische Element (160), 45

- Drehen des Haltemechanismus (200), um zu bewirken, dass sich das Halteelement (250) ausdehnt, um aus der Wellenausnehmung (142) herauszukommen, und 50
- Entlasten der Kraft auf den Haltemechanismus (200).

Revendications

1. Ensemble de rétroviseur repliable (100) pour véhicules automobiles, l'ensemble (100) comprenant:

- un élément de base (120), destiné à être monté sur un véhicule automobile;
- un boîtier de miroir (110);
- un arbre (140) agencé de telle sorte que le boîtier de miroir (110) est autorisé à tourner par rapport à l'élément de base (120) entre une position de fonctionnement du miroir et une position de miroir replié, et vice versa;
- un élément élastique (160) associé avec l'arbre (140) et agencé de telle sorte qu'une force est appliquée à la fois sur l'élément de base (120) et le boîtier de miroir (110); et
- un mécanisme de retenue (200) comprenant un élément de verrouillage (260) pour porter un élément de retenue flexible (250) serré à l'intérieur,

dans lequel l'élément de retenue flexible (250) peut être déplacé vers l'élément de verrouillage (260) entre au moins une position de libération, dans laquelle l'élément de retenue flexible (250) peut être déplacé par rapport à l'arbre (140), et une position de verrouillage, dans laquelle l'élément de retenue flexible (250) est reçu dans une cavité (142) formée dans l'arbre (140) provoquant le verrouillage de l'élément de retenue flexible (250) sur l'arbre (140), de sorte que l'élément élastique (160) est retenu axialement contre l'élément de verrouillage (260),

caractérisé en ce que l'élément de retenue flexible (250) a au moins une partie d'accrochage comprenant au moins une portion d'extrémité libre sensiblement incurvée pour empêcher l'élément de retenue flexible (250) d'être retiré de l'élément de verrouillage (260).

2. Ensemble de rétroviseur repliable (100) selon la revendication 1, dans lequel l'élément de verrouillage (260) est adapté pour retenir l'élément de retenue flexible (250) verrouillé sur l'arbre (140) dans la position de verrouillage. 50

3. Ensemble de rétroviseur repliable (100) selon la revendication 2, dans lequel l'élément de verrouillage (260) comprend au moins une paroi ou une protubérance (265) adaptée pour limiter la déformation 55

de l'élément de retenue flexible (250) dans la position de verrouillage de manière à maintenir verrouillé sur l'arbre (140).

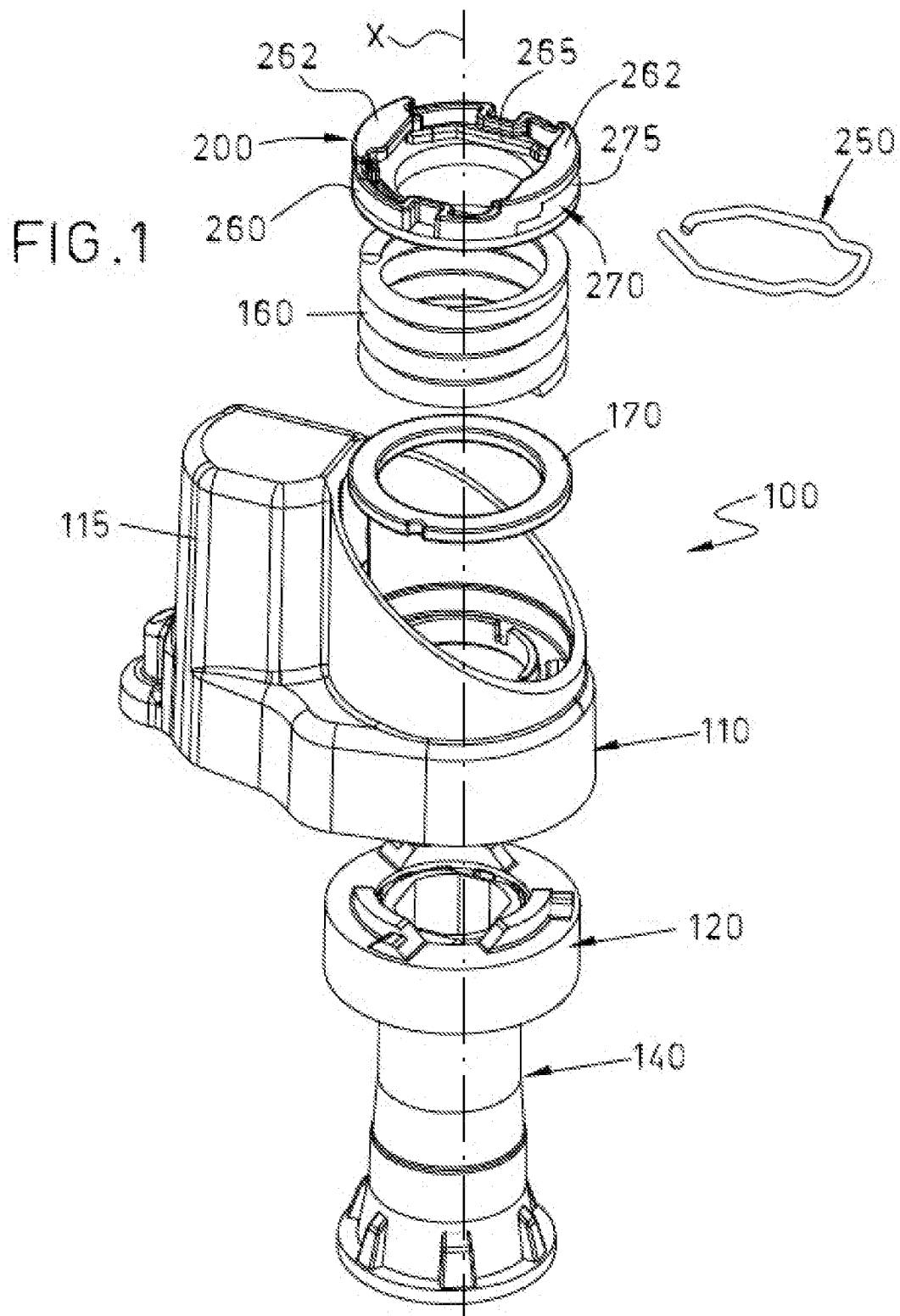
4. Ensemble de rétroviseur repliable (100) selon la revendication 3, dans lequel ladite paroi ou protubérance (265) est adaptée pour limiter la déformation de l'élément de retenue flexible (250) dans une direction radiale à l'arbre (140). 5
5. Ensemble de rétroviseur repliable (100) selon l'une quelconque des revendications précédentes, dans lequel l'arbre (140) comprend au moins une surface inclinée (145) sur laquelle l'élément de retenue (250) peut glisser, provoquant son expansion avant d'être reçu dans la cavité d'arbre (142). 10
6. Ensemble de rétroviseur repliable (100) selon l'une quelconque des revendications précédentes, dans lequel l'élément de retenue flexible (250) est formé pour s'accoupler au moins en partie avec une section de l'arbre (140) le long de la cavité d'arbre (142). 15
7. Ensemble de rétroviseur repliable (100) selon la revendication 6, dans lequel l'élément de retenue flexible (250) est dimensionné de telle sorte que, lorsque l'élément de retenue flexible (250) est reçu dans la cavité d'arbre (142), l'élément de retenue flexible (250) est libéré. 20
8. Ensemble de rétroviseur repliable (100) selon la revendication 6, dans lequel l'élément de retenue flexible (250) est dimensionné de telle sorte que, lorsque l'élément de retenue flexible (250) est reçu dans la cavité d'arbre (142), l'élément de retenue flexible (250) est dans un état libéré. 25
9. Ensemble de rétroviseur repliable (100) selon l'une quelconque des revendications précédentes, dans lequel l'élément de verrouillage comprend une rondelle de verrouillage (260) à l'intérieur de laquelle l'arbre (140) peut être inséré. 30
10. Ensemble de rétroviseur repliable (100) selon l'une quelconque des revendications précédentes, dans lequel l'élément de retenue flexible comprend un ressort de verrouillage (250) qui peut être serré à l'intérieur de l'élément de verrouillage (260) et y déplacer la position de libération et la position de verrouillage. 35
11. Ensemble de rétroviseur repliable (100) selon l'une quelconque des revendications précédentes, dans lequel l'élément de verrouillage (260) a au moins une partie d'arrêt (262) pour limiter le mouvement de l'élément de retenue flexible (250) entre la position de libération et la position de verrouillage. 40

12. Procédé d'assemblage d'un ensemble de rétroviseur repliable (100) pour véhicules automobiles selon l'une quelconque des revendications précédentes, le procédé comprenant:

- fournir un mécanisme de retenue (200) avec un élément de verrouillage (260) ayant un élément de retenue flexible (250) serré à l'intérieur, et
- insertion de l'arbre (140) de l'ensemble de rétroviseur repliable (100) dans l'élément de verrouillage (260) contre l'élément élastique (160) disposé entre eux, ce qui fait de l'élément de retenue flexible (250) à être reçu dans une cavité d'arbre (142) de manière à retenir axialement l'élément élastique (160) contre l'élément de verrouillage (260) et à provoquer la libération de l'élément élastique (160) lorsqu'il coulisse sur une surface inclinée d'arbre (145) jusqu'à ce qu'il soit reçu dans la cavité d'arbre (142). 45

13. Procédé pour démonter un ensemble de rétroviseur repliable (100) pour véhicules automobiles selon l'une quelconque des revendications 1 à 11, le procédé comprenant:

- appliquer une force au mécanisme de retenue (200) contre l'élément élastique (160),
- faire tourner le mécanisme de retenue (200) de manière à faire de l'élément de retenue (250) à être libéré pour sortir de la cavité d'arbre (142), et
- relâcher la force sur le mécanisme de retenue (200). 50



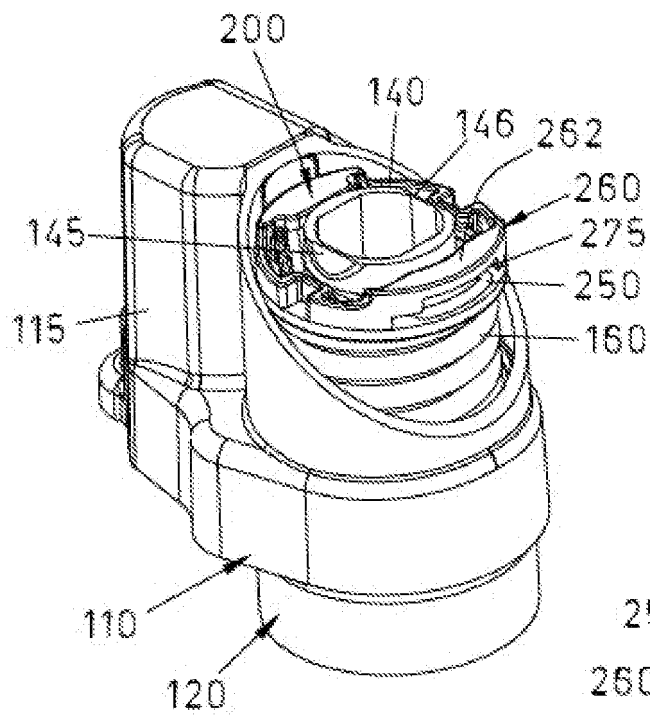


FIG. 2

FIG. 3

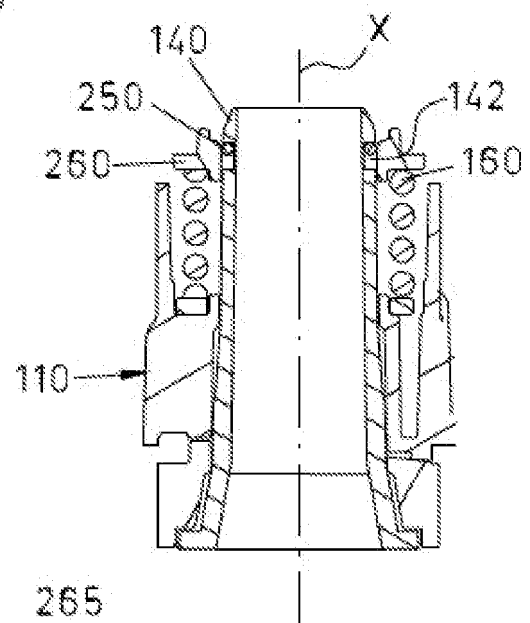
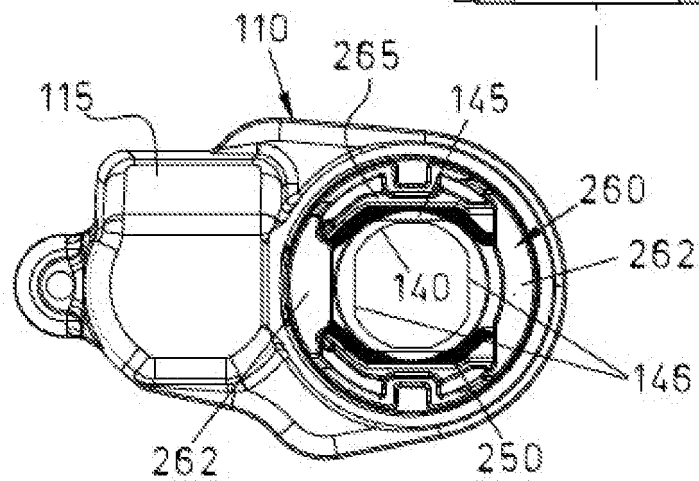
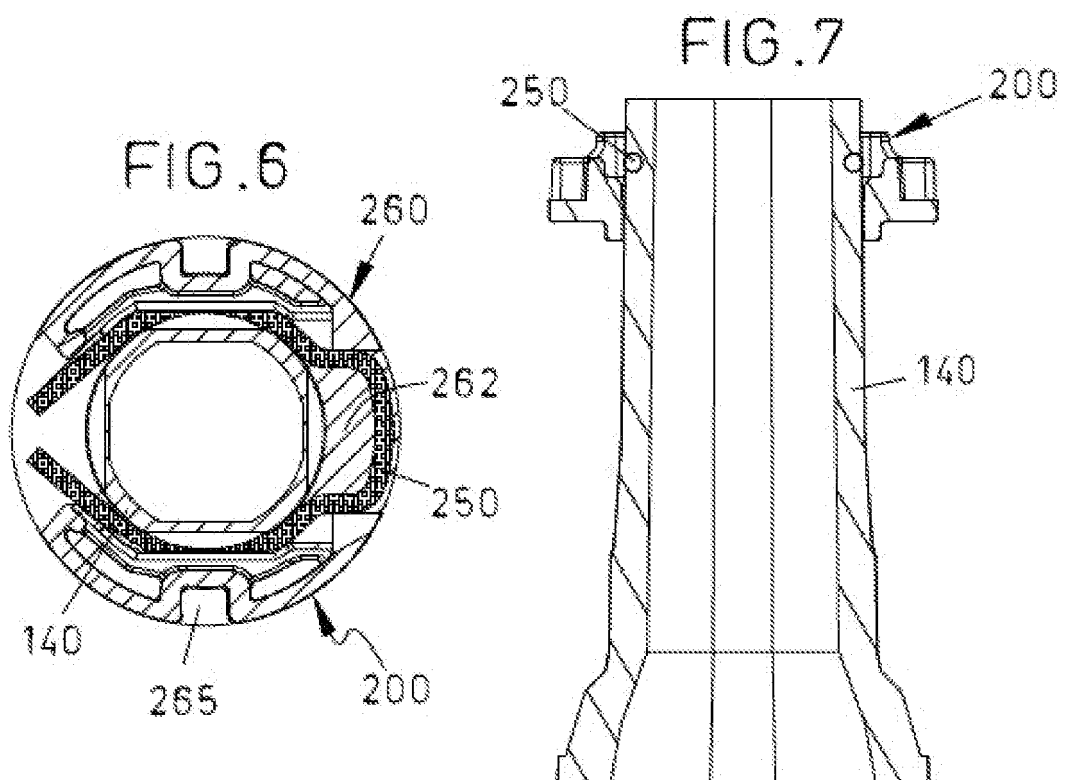
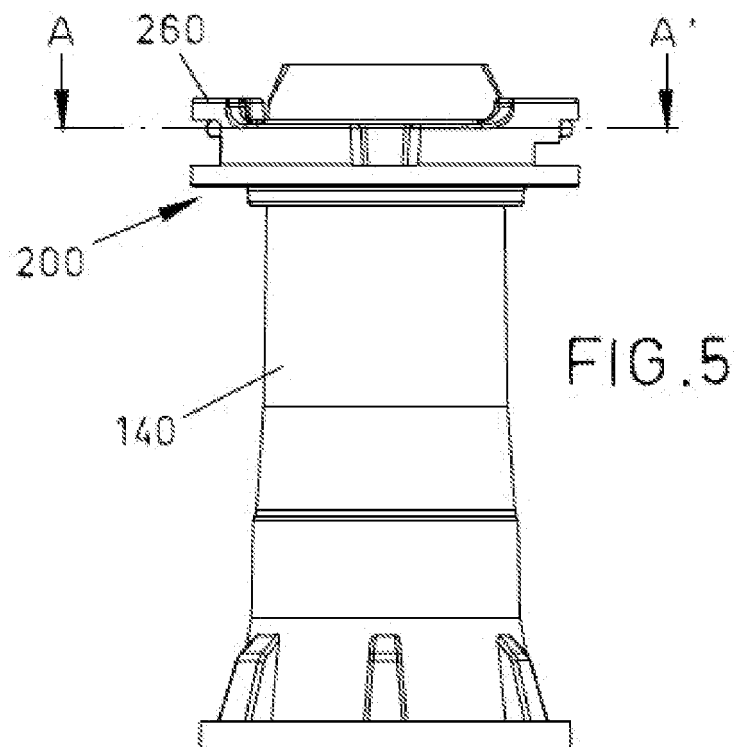


FIG. 4





REFERENCES CITED IN THE DESCRIPTION

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